to Mr. Robert F. Gilder, of Omaha, who described and figured the skulls in the *World-Herald,* October 21.

That there was intrusive burial in this mound is apparent from the fact that the skulls found below a layer of burned clay are of a much more primitive type than those found above it. Already five skulls have been taken from the lower level, and three from the upper, and others are in evidence and will be dug out later. Those of the upper layer probably belonged to Indians of a later period, and may be left out of account for the present. The skulls of the lower layer are low-browed and inferior, the superciliary ridges being thick and protruding, the distance through the temples narrow, and the frontal eminences being as feebly developed as in Neanderthal man. The low arch of the skull is not the result of head-binding, but is normal and characteristic as is evidenced by five crania, two of which are fairly complete. Unfortunately the occiput is fragmentary or wanting in the specimens now at hand.

The skulls are brachycephalic, and extremely narrow in transverse diameter through the temples, expanding rapidly at the parietals. Length of skull 182 mm.; minimum breadth 93 mm.; maximum breadth 160 mm.

In shape and size the mandible agrees well with that of modern man, although the following marked differences are to be noted; the bone, particularly in the region of the symphysis, is far heavier, the muscular scars more prominent, and the third molar in each case is ground to the very gum, while the second and third are ground in a diminishing ratio. The canines are weak and scarcely distinguishable from the incisors, and the space between the molars and the base of the coronoid is wide.

The limb bones indicate a stature of six feet, the femora being somewhat stronger, and the humeri being somewhat weaker than might be expected. The femora, which are massive, manifest an interior curvature more pronounced than ordinary, and in cross section they appear triangular through the great development of the linea aspera, all muscular scars and tuberosities are noticeably prominent, the scar for ligamentum teres being elliptical in outline, deep and nearly twice as long as broad.

The skulls of the Nebraska man seem to be inferior to those of the mound builder, but for the present at least will be viewed as early representatives of that tribe.

In corroboration are the flint implements or chips found associated with the skulls and bones, and the mode of burial. As work progresses a detailed illustrated report will be made.

E. H. BARBOUR,
H. B. WARD.

THE UNIVERSITY OF NEBRASKA,
October 27, 1906.

THE SECOND DECENNIAL OF THE BOTANICAL SEMINAR OF THE UNIVERSITY OF NEBRASKA.

THE botanical seminar of the University of Nebraska was organized, under the name of the 'Sem. Bot.,' as a secret society, by several advanced students in botany, on October 11, 1886. For some years it was an exclusive secret society. About 1891 it changed its policy and became a serious, scientific organization, aiming to promote research and, in particular, to organize the study of the vegetation of the state. Since that time it has admitted advanced students from time to time and has established two preliminary grades to which students are admitted after examination as a preparation for ultimate membership. It has conducted, since 1892, the botanical survey of Nebraska, has built up the survey herbarium and has published three parts of a 'Flora of Nebraska,' eight reports of the botanical survey, and the first volume of the 'Phytogeography of Nebraska.' At the same time that it has been engaged in this serious work, it has kept up the traditional secret organization, which now survives in certain traditional insignia, in the three grades of membership, and in certain traditional ceremonies.

On October 11 the seminar celebrated its second decennial. In the afternoon of that day all work in the botanical laboratories was suspended, and at three o'clock an open meeting was held which took the form of a sym-

posium on field methods, presided over by Dr. Clements.

In opening the symposium, Dr. Clements pointed out that the first decade of the organization coincided very closely with the period in which the botanical laboratory reached its greatest development. Consequently, in 1896, when the first decennial was celebrated, it was appropriate that the subject of the symposium should be 'Laboratory Methods.' During the second decade of its existence, it had fallen to the lot of the seminar not only to take part in, but also in large part to guide, the development of field work in ecology. For that reason it was especially fitting that the symposium on the occasion of the second decennial should deal with field methods.

Dr. Bessey spoke next upon 'The Place of Field Work in Botany.' He said in part:

> The simplest kind of field work, and on many accounts the most productive and helpful, is that observation of plants and their environment which one makes when living much in the forests, the prairies, the swamps, the fields and the gardens. The man who lives 'in the open' and learns of plants and about plants while living with them, obtains a mass of most valuable botanical knowledge even though it may not be formulated in botanical language. Many an unlearned Thoreau knows much more about the habits of plants than the laboratory botanist who is a stranger to the wild plants in their native haunts. Then there is the more serious field—study in which with book or instrument the botanist tries to learn something accurately about plants as they grow out of doors. Here he learns something as to their classification in accordance with some general system and by means of his instruments, he learns something accurately as to the factors in the plant's environment that have controlled its growth and distribution. With such study, there usually comes the practise of collecting plants followed by the work of preserving, mounting and arranging in systematic order in the herbarium. This leads to closer and more accurate examination in the herbarium and the laboratory, and especially with the smaller kinds to critical microscopical study. Field work should underlie all botanical study. It can not be omitted without making the science one-sided. The student must do much of his work in the fields, forests and gardens if he is to make botany a science of living plants.

Dr. Barbour spoke upon 'Field Work in Geology and Physiography.' He called attention to the relation of ecological and physiographical work in the field from the point of view of the geologist and the physiographer, showing, among other things, how the result of ecological investigation has enabled the physiographer to reach better results by enabling him to trace more accurately the physiographical conditions which he studies, by reference to the resulting effects upon vegetation.

Dr. Pound spoke of the field work done in the past by the seminar. He suggested that field work as conducted by the seminar in the past fell into three stages. In the first period, from 1886 to 1892, it took the form of collection only. During that time the object was simply to collect species and to make as many additions as possible to the reported flora of the state. In the second period, from 1892 to 1898, the object of field work was floristic. During that time the foundations of phytogeographical work were laid, while the survey herbarium was built up and collecting continued. The work was chiefly directed toward determining the geographical distribution of species in the state, the working out of floral contrast between districts and regions, and regional limitation. Toward the end of that period, the method of study of abundance by the quadrat was adopted. The third period, from 1898 to the present, has been marked by research work in ecology and the development of improved research methods.

Dr. Heald spoke of field work in pathology. He said that, while formerly pathological investigation had been conducted almost wholly in the laboratory, the tendency at the present time was to go to the other extreme and to work chiefly in the field. He pointed out the necessary limitations upon each method of work in pathology and the relations of the one to the other.

In closing, Dr. Clements suggested a prophecy and a warning. As botany becomes broader and surer in its progress, the relative position of laboratory work and field work will be changed. The field will take the first place. The laboratory, though indispensable, will become secondary in that its chief use

will be to assist the interpretation of field facts and field experiments. For many reasons, this shifting of emphasis must be slow. Field methods must be developed and refined and students must be trained in their use. Field work demands instruments, base stations and much experience not for months but through years. In short, with these things, the field will become the real laboratory which must always be supplemented by secondary laboratories of histology, by plant houses, and the like. Each generation of botanical students is apt to feel that the beginnings of botany do not much antedate the beginning of its study of the subject. It sees and reads and does the things that are most recent and rarely dips into the past. It loses sight of the fact that development is of necessity a slow process and that most of the ideas and methods of to-day have a history. Hence, while the new generation is instructed to search diligently in the field and laboratory, it must not ignore the records of the past to be found in the books.

Following the open meeting, a regular meeting was held at five o'clock at which fifteen undergraduate students, who had been duly examined, were initiated in the preliminary degree of 'candidatus,' and four graduate students were promoted to the intermediate degree of 'novitius.' Thereafter, at six-thirty, a collation was spread in one of the laboratories to which a number of guests, members of the faculty of the university, had been invited. At the speaking after the collation, Dr. Pound presided. The speakers were Dr. Bessey, Dr. E. W. Davis, dean of the College of Arts, Dr. H. K. Wolfe, professor of educational psychology, and Dr. Bolton, professor of psychology.

PHYSIOLOGICAL ECONOMY IN NUTRITION.

IRVING FISHER, professor of political economy at Yale University, has been conducting experiments to discover whether proper mastication and enjoyment of food would produce the 'physiological economy' claimed for it by Mr. Horace Fletcher, and also whether it would lead to the use of low proteid according to the standard advocated by Professor Chittenden. The result of the experiment would seem to answer both these questions in the affirmative. The experiments were conducted with nine Yale students and lasted from January to June, 1906. Careful record of the amounts of food taken, and the constituents in, proteids, fats and carbohydrates, was kept for each man for each day. To avoid weighing at the table, the food was all weighed in the kitchen and served in 'standard portions' of 100 calories each or simple fractions or multiples thereof, so that the men merely needed to record the number of portions eaten. The proportions of proteids, fats and carbohydrates were found by means of the Mechanical Diet Indicator described by Professor Fisher in the *American Journal of Physiology* for April. During the first half of the experiment the men followed two rules only. The first was to thoroughly masticate the food up to a point of 'involuntary swallowing' with the attention, however, upon the taste and enjoyment of the food rather than upon the mere mechanical act of mastication. Any 'counting of chews' was discouraged as was also the forcible holding of food in the mouth, as experience of others, as well as the conclusions of Pawlow, had seemed to show that anything which tended to make eating a bore harmed rather than helped digestion. The second rule was to obey implicitly the leadings of appetite, both in regard to quantity of food and the choice between different foods. In order that this strict obedience to appetite might be the more easily followed, a wide range of choice of foods was supplied and no food was placed before the men which was not specially ordered by them.

This first half of the experiment, therefore, was really an experiment in natural eating, if we may assume that it is unnatural to hurry through our meals and to eat what is set before us, out of politeness, habit or limitation of choice. It was found that, as a consequence of the thorough mastication and obedience to appetite, a profound change occurred in the diet of the men. There was a large reduction in the quantity of liquids of all kinds at meals —water, tea, coffee and even soups. There was a reduction in the total daily average of